

**We claim:**

1. An isolated nucleic acid molecule from  
*Magnaporthe grisea* that confers rice cultivar CO39-  
5 specific avirulence to fungal plant pathogens that  
contain the nucleic acid.

2. The nucleic acid molecule of claim 1, which  
is AVR1-CO39.

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3. The nucleic acid molecule of claim 2,  
having a sequence comprising part or all of SEQ ID NO:1.

4. The nucleic acid molecule of claim 1, which  
15 encodes a polypeptide having the features of a  
polypeptide comprising a sequence selected from the group  
consisting of SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ  
ID NO:5, SEQ ID NO:6, SEQ ID NO:7 and SEQ ID NO:8.

5. The nucleic acid molecule of claim 4, which  
20 encodes a polypeptide having a sequence selected from the  
group consisting of SEQ ID NO:2, SEQ ID NO:3, SEQ ID  
NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7 and SEQ ID  
NO:8.

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6. A recombinant DNA molecule comprising the  
nucleic acid molecule of claim 1, operably linked to a  
vector for transforming cells.

7. The cell of claim 1, selected from the

group consisting of bacterial cells, fungal cells, insect cells and plant cells.

9. The transformed cell of claim 8, which is  
5 an epiphytic bacterial cell.

10. A transgenic plant regenerated from the transformed cell of claim 8.

10 11. An isolated nucleic acid molecule having a sequence selected from the group consisting of:

a) part or all of SEQ ID NO:1;

b) an allelic variant of part or all of SEQ  
ID NO:1;

15 c) a natural mutant of part or all of SEQ  
ID NO:1;

d) a sequence hybridizing with part or all  
of SEQ ID NO:1 or its complement and encoding a  
polypeptide substantially the same as any of the  
20 polypeptides encoded by SEQ ID NO:1; and

e) a sequence encoding part or all of a  
polypeptide having an amino acid sequence selected from  
the group consisting of SEQ ID NO:2, SEQ ID NO:3, SEQ ID  
NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:7 and SEQ ID  
25 NO:8.

12. An oligonucleotide between about 10 and  
about 100 nucleotides in length, which specifically  
hybridizes with a portion of the nucleic acid molecule of  
30 claim 11.

13. A transgenic plant regenerated from the transformed cell of claim 11.

14. A cell transformed with the recombinant DNA molecule of claim 13.

5 15. The cell of claim 14, selected from the group consisting of bacterial cells, yeast cells and plant cells.

10 16. The cell of claim 15, which is an epiphytic bacterial cell.

17. A transgenic plant regenerated from the cell of claim 15.

15 18. A polypeptide encoded by the nucleic acid molecule of claim 11.

19. Antibodies immunologically specific for the polypeptide of claim 18.

20 20. A protein encoded by an isolated nucleic acid molecule from *Magnaporthe grisea* that confers rice cultivar CO39-specific avirulence to fungal plant pathogens that contain the nucleic acid.

25 21. The protein of claim 20, encoded by an AVR1-CO39 gene.

22. The protein of claim 21, which is encoded by ORF 3 of AVR1-CO39.

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SEQ. ID NO:1, SE. ID NO:2, SE. ID NO:3, SE. ID NO:4, SE. ID NO:5, SE. ID NO:6, SEQ. ID NO:7 and SEQ. ID NO:8.

24. Antibodies immunologically specific for the protein of claim 20.

5 25. A transgenic epiphytic bacterium that expresses a portion of an AVR1-CO39 gene effective to confer rice cultivar CO39-specific avirulence to microorganisms expressing the gene.

10 26. The transgenic epiphytic bacterium of claim 24, which expresses CRF3 of SEQ ID NO:1, or a functional equivalent.

15 27. A method of enhancing the scope of resistance of rice cultivar CO39 plants to pathogenic microorganisms, which comprises treating the plants with a polypeptides produced by expression of AVR1-CO39, in an amount effective to trigger expression of a CO39-specific R gene in the plants.

20 28. The method of claim 27, comprising treating the plants with a solution comprising the polypeptides.

25 29. The method of claim 27, which comprises treating the plants with an epiphytic bacterium that expresses a portion of an AVR1-CO39 gene that produces the polypeptides effective to trigger expression of the CO39-specific R gene in the plants.